

2011

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### Recommended Citation

Shen, Min; Zhang, Chang-Qin; and Wallace, Gary D. (2011) "Rediscovery of *Monotropastrum sciaphilum* (Andres) G.D.Wallace in China after 91 Years," *Aliso: A Journal of Systematic and Evolutionary Botany*: Vol. 29: Iss. 2, Article 4.  
Available at: <http://scholarship.claremont.edu/aliso/vol29/iss2/4>

## REDISCOVERY OF *MONOTROPASTRUM SCIAPHILUM* (ANDRES) G.D. WALLACE IN CHINA AFTER 91 YEARS

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### ABSTRACT

*Monotropastrum sciaphilum* (Ericaceae), a mycoheterotrophic member of subfamily Monotropoideae, was rediscovered at its type locality in Yunnan Province, China, 91 years after it was first collected. The type locality is the only locality from which it is known. Field observations in 2007–2010 indicated that inflorescences emerge from the soil between late April and early September. The restricted distribution of *M. sciaphilum* recommends its listing in the IUCN red book.

Key words: China, Ericaceae, *Monotropastrum sciaphilum*, Monotropoideae, Otto Schoch, rediscovery, Yunnan.

During field work in Yunnan Province, China, in 2007, we found colonies of *Monotropastrum sciaphilum* (Andres) Wallace (Ericaceae: Monotropoideae) (Fig. 1). This species had not been collected since 1916 when Otto Schoch collected what was to become the type and only-known specimen (Andres 1953; Fig. 2). Only two papers have been published on this species since that time: (1) Andres (1953) described Schoch's specimen as *Eremotropa sciaphila*, 37 years after it was first collected; and (2) Wallace (1987) transferred *E. sciaphila* to genus *Monotropastrum* (as *M. sciaphilum*). We are delighted to have rediscovered the species after 91 years.

*Monotropastrum sciaphilum* was collected at Qiongzhu (Bamboo) Temple, Kunming, Yunnan Province, the type locality for the species (altitude 2157 m, latitude 25°04.151'N, longitude 102°36.920'E). It occupies relatively moist and dark, mixed evergreen and deciduous broadleaved forest, where it co-occurs with *Rhododendron siderophyllum* Franch., *R. spiciferum* Franch., *R. racemosum* Franch., and *Pieris japonica* (Thunb.) D. Don (Ericaceae), *Pinus yunnanensis* Franch. ex G. Don (Pinaceae), and *Quercus variabilis* Blume and *Q. aliena* Blume (Fagaceae). At the same site, we also found *Monotropa uniflora* L. (Fig. 3) and *M. hypopitys* L. (Fig. 4), the only two species in genus *Monotropa*.

Based on our field observations at this site from 2007 to 2010, inflorescences emerge from the soil between late April and early September. We identified *M. sciaphilum* using the description of this species in the *Flora of China* (Qin and Wallace 2005), which in turn is based on the original description and drawing (Andres 1953), and on details provided in Wallace (1987) because there are no specimens in any herbarium in China. Mature fruits and seeds are unknown because the berry is not mature on the type specimen—a collection of several inflorescences (Wallace 1987; Fig. 2)—so a definitive description of the mature fruit and seeds is not possible at this time. The type and only-known specimen is deposited in the herbarium of the University of

Vienna (WU), Austria (Wallace 1987). We studied the photograph of this specimen (Fig. 2) and drawings made from dissections illustrated in Wallace 1987.

Both species of *Monotropastrum*—the more common Asian species *M. humile* (D. Don) H. Hara and the endemic *M. sciaphilum*—occur in China (Fang et al. 2005). *Monotropastrum* and *Monotropa* are included in subfamily Monotropoideae which has previously been placed in Pyrolaceae (Fang and Hu 1990) but is now consistently included in Ericaceae (Kron et al. 2002; Fang et al. 2005; Tucker 2009). Monotropoideae (incl. Pyroloideae) accommodate 50 species in 14 genera in N. America (Tucker 2009) and 36 species in 6 genera in China (Fang et al. 2005).

*Monotropastrum* and *Monotropa* are mycoheterotrophic (Leake 1994). Reportedly, such plants are associated with a limited number of fungal species, which in turn are linked to autotrophic plants (Björkman 1960; Cullings et al. 1996). This unique mycorrhizal variant has been called a monotropoid mycorrhizal association (Smith and Read 1997; Massicotte et al. 2005).

In the USA, many members of Monotropoideae are restricted to old-growth forests (United States Department of Agriculture 1993), and *Monotropastrum sciaphilum* occurs in similar sites in China. Although so far, the species has apparently persisted despite its close proximity to the temple, it may become endangered because it is known from a single occurrence. We recommend that the species be considered for publication on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List.

### ACKNOWLEDGMENTS

We are grateful to Walter Till, Curator of the Herbarium WU, and Heimo Rainer, Assistant Curator of WU, for the image of the Schoch specimen. This study was supported by the National Natural Science Foundation of China (No. 30770139), Plan of Condition Platform Construction of Yunnan, China (No. 2010DH011).

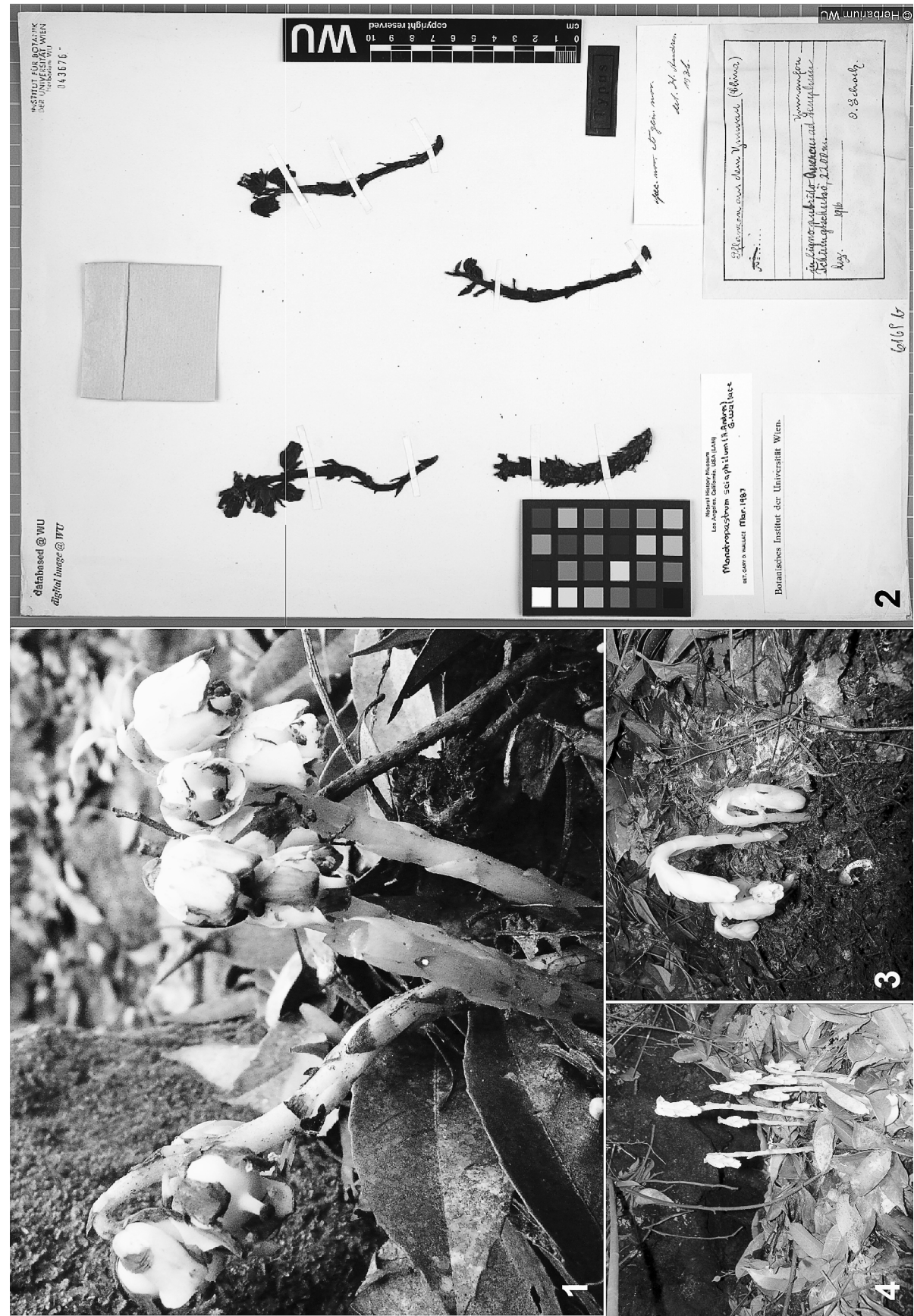


Fig. 1-4. *Monotropastrum sciaphilum* and its monotropoid associates.—1. *Monotropastrum sciaphilum* growing at the type locality, Qiongzhu (Bamboo) Temple, Kunming, Yunnan Province, China.—2. Type specimen of *M. sciaphilum* collected by Otto Schoch in 1916 and housed at WU (Vienna, Austria).—3-4. Monotropoid associates growing at the type locality of *M. sciaphilum*.—3. *Monotropastrum uniflora*.—4. *Monotropastrum hypopitys*.



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